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Interpersonal Comparisons of Utility in Bargaining: Evidence from a Transcontinental Ultimatum Game[1]

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Abstract:

This paper presents the experimental results of a "Transcontinental Ultimatum Game" implemented between India and France. The bargaining took the form of standard ultimatum games, but in one treatment Indian subjects made offers to French subjects and, in another treatment, French subjects made offers to Indian subjects. We observed that French→Indian bargaining mostly ended up with unequal splits of money in favour of French, while nearly equal splits were the most frequent outcome in Indian→French interactions.

The experimental results are organized through a standard social reference model, modified for taking into account the different marginal value of money for bargainers. In our model bargaining is driven by relative standings comparisons between players, occurring in terms of real earnings (that is monetary earnings corrected for a purchasing power factor) obtained in the game. The norm of equity behind the equalization of real earnings is called local equity norm, and contrasted to a global equity norm which would encompass the wealth of players beyond the game. According to what we observed, no beyond-game concern seems to be relevantly endorsed by subjects.

Keywords: Interpersonal Comparisons of Utility, Fairness, Bargaining experiment, Ultimatum Game

JEL code: A15, C70, C91, D63

1. Introduction

1.1. What is an "equitable share"?

Differently from normative theories of justice, positive Economic Theory has traditionally made without interpersonal comparisons of utilities (ICU). Recent empirical work has however greatly challenged this received view and highlighted that, when norms of justice and fairness concerns influence behaviors, an accurate positive theory needs to embody interpersonal comparisons of utilities. While relative standing comparisons models (Fehr and Schmidt, 1999; Chairness and Rabin, 2002) account for bargaining interactions driven by fairness consideration, they usually rest on the assumption of equal marginal value of money. This paper mainly aims at relaxing this assumption and raises the question of what are the relevant interpersonal comparisons of utilities in an experimental setting when money is differently worth to players. In such a context, the question of what is an "equitable" outcome is not obvious, various views of what practical justice implies providing different answers. This paper considers the three following alternative views[3]:

- Along the baseline view, inter-personal comparisons of well-being do not have any role in shaping distribution. For instance, if a (divisible) good has to be divided between two individuals they should each receive half of it, whoever they are. Call this view '*Formal equality'*.
- Along a second view every occasion should be used to reduce as much as possible inequalities. For instance if a (divisible) good has to be divided between a poor and a rich individual, the largest part should a priori be given to the poor one. Interpersonal comparisons of utilities encompass the whole situation of the individuals and not only the local gain obtained from the interaction. This view can be referred as '*Compensation equity'*.
- Finally, a third view recommends the equalization of the local benefits that individuals draw from a given situation. It relies on inter-personal comparisons of these benefits, and only of these. For instance, suppose that a (divisible) good has to be divided between two persons and that, from every unit of the good, the first person draws a lower benefit than the second;

[3] The first view is a standard view in theories of distributive justice, while the second and the third ones, although partly related to the conceptions of local and global equity (Elster, 1993), are specifically introduced and discussed in this paper with respect to our experimental setting.

then the first person should receive more units of the good that the second. Call this view '*Local equity'*.

The goal of this paper is to test these three competing views. To that aim, we designed and ran a bargaining laboratory experiment where rich and poor subjects played against each other and where the stake over which subjects bargained was differently worth to them.

The participants were drawn from countries living under different economic conditions and the diversity was controlled along two dimensions: the income and the purchasing power. With respect to the first point, we chose a high level of income country (France) and a low level of income country (India). With respect to the second point (real value of money), the bargaining was done in US dollars and actual exchange rates were used to convert dollar pay-offs to final pay-offs (Indian and French subjects received respectively pay-offs converted into Indian rupees and into euros).

The implications of the aforementioned Justice Views in the context of transcontinental game between Indian and French are straightforward. The Formal Equality view would maintain that Indian and French receive the same amount of dollars. Since the actual exchange rates and the prices structures are such that, for a given amount of money, Indian students can buy more than French students, the Local Equity view would advocate that French should receive more in the bargaining. Finally, Compensation View would recommend that Indian students receive more in the game as, overall, they are worst-off than French students.

This allows raising the main question of this paper: Which (if any) notion of Equity is relevant in order to describe bargaining behavior?

1.2. The Ultimatum game: standard results and explanations.

To test the various views of practical justice, we implemented an Ultimatum Game (henceforth UG). In the UG two individuals have to reach an agreement about how to divide a good that is valuable to both them– a sum of money—a stake—a pie. In the sequential form of the UG, the first player (the sender) makes an offer about the division of the pie to the second player (the receiver). If the receiver accepts the offer, she receives the offered amount while the sender's payoff is the stake minus the offer. If the receiver rejects the offer, both players obtain a zero payoff.

Under the assumptions that players are rational, risk-neutral and have perfect and common knowledge, standard theory predicts that the receiver accepts any offer made by the sender. Any division of the stake is sustained by a Nash equilibrium—even the one where the sender

makes an offer of zero to the receiver (and the latter accepts). In the sequential version of the UG, however, one can compute a unique sub-game-perfect equilibrium by considering that the optimal strategy for the receiver in the smallest sub-games of the game (the ones where the receiver has to choose between accept or reject the offer) is to accept any small offer (epsilon). In the larger sub-game (that in the UG coincides with the game it-self) the strategy of the sender is to offer epsilon.

UG has been the object of an extensive experimental work (since Güth *et al.*, 1982), and this is for at least two reasons: the simplicity of the game and the large empirical puzzling evidence on it. Most striking anomalies are the following: offers that are inferior to the 20% of the stake are rejected with a probability that exceeds one-half, and the average offer is between 30 and 40% of the stake, depending on how high the probability of rejection is anticipated by the senders[4].

The discrepancy between theory and empirical evidence has proved to be very robust to the experimental protocol retained (where factors like context, subjects, kind and size of the stake, numbers of rounds, etc. have been variously specified; see Camerer, 2003, for an extensive discussion). In particular, UG was experimented in different countries[5] (since Roth *et al.*, 1991, and Buchan *et al.*, 1997). Although observations may differ from one country to another, the main qualitative findings are robust[6].

Several explanations have been provided to reconcile the apparent inconsistency of standard theory and empirical evidence. Most of them paid attention to the social norms that individuals would bring into the game and that would affect their behavior beyond what standard theory commonly assumes. According to these explanations, the utility that players may derive from the game would incorporate social considerations such as the relative standing of each player after the bargaining is concluded, and the way the agreement is reached. On one hand, a large set of models has focused on the feelings of envy or of injustice

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[4] For surveys on the UG the reader is referred to Güth (1995) or Roth (1995) and Camerer (2003).

[5] We are not aware of Indian studies or between countries ultimatum game.

[6] The most remarkable exceptions are the UG experiments run in 17 small-scale societies by Heinrich *et al.* (2001). Overall, offers varied substantially among these societies and rejections' behaviors were less homogenous than usual. However, no clear pattern emerged: in some societies rejections barely occurred -even at very low offers- while in some others respondents behaved very toughly, rejecting even equal split. As a plausible explanation of such variability, authors put forward the diversity of social institutions and fairness norms across these societies. These studies are not directly relevant for us, since France and India are large-scale societies in which money is the usual mean of exchange.

that very unequal bargaining outcomes trigger. The degree of envy or aversion to inequality determines to what extent a division of the stake will be accepted when it is different from the equal split (Bolton 1991, Fehr and Schmidt 1999). On the other hand, models of intentional or reciprocal behavior (Rabin 1993, Dufwenberg and Firchsteiger 1998) assume that a relevant rationale for action is to reciprocate what one's opponent is expected to do or to reciprocate what she actually does. Models of intentional or reciprocal behavior also incorporate notions of fairness or justice, not directly as an argument of the individual's utility function, but mediated by the individual's understanding of what is the norm in a given circumstance. Fairness is a rewarding response to fairness as well as unfairness is a retaliating response to selfishness; in the UG, receivers accept offers only when they consider them sufficiently fair and reject them otherwise.

1.3. Interpersonal comparisons and the transcontinental design

In both aversion to inequality and reciprocity models, it has been usually neglected that the marginal value of money for a player can be something different from the consequence of the bargaining process as, for instance, when players have different preferences or live under different *ex-ante* circumstances. In most experiments the assumption that the marginal value of money is the same for all players is reasonable, since subjects are anonymously drawn from the same population; hence *ex-ante* inequality (or other "inborn" difference) cannot be taken into consideration.[7] On the other hand, two players that *ex-ante* are not equally better-off may give a different marginal value to the money earned in the negotiation.

Although they do not relax the assumption of identical marginal value of money, Kagel *et al.* (Kagel *et al.* 1996) discuss how comparison of utilities can affect individual behavior when players negotiate over tokens with different monetary values, and hence one can test whether the relevant rule for action is the willingness to compensate for different final utilities (expressed in real pay-offs). The experimental device adopted was to use two different exchange rates to convert experiment token payoffs in actual money payoffs.[8] Experimental

[7] In the standard version of the UG the amount to be divided is equal for both players, thus "a token is a token" for both the sender and the receiver. If it is common knowledge that (a) the monetary value of the token is the same for both players and (b) the utility of money is the same for both players, it is correct to assume that the marginal value of one token left for the receiver is equal to the marginal value of the token the sender renounces to.

[8] Fairness had been a relevant rationale for action the following should have been observed: in case where the high exchange rate has been used for computing sender's gains, the sender should have offered more than the

evidence suggests that when senders had higher exchange rate, offers were at about the equal split during the first three rounds of the game and increased afterward as rejection rates were very high (53%). When receivers had higher conversion rates, senders' offers were not materially different from the equal money split offer (25 out of 100). On average, rejection rates were 14%.

The main innovation in our experimental design is the following. We let it be common knowledge that players participating in the ultimatum game were different *ex-ante* in two respects. First they most likely had a different monetary value of the experimental currency (US dollar) because with one dollar one can buy much more goods in India than in France (about four or five times more). Second, they also probably had a different overall income because the per capita GDP is much larger in France than in India (about 50 times larger). With respect to Kagel *et al.*'s study, this second element is original. Our goal is to study how this twofold source of diversity between players (the game-related one and the actual life-circumstances one) affects the comparison of utility that players perform during the bargaining. The design of the experiment consists of transcontinental treatments (sender and receiver from different countries) and of continental treatments (sender and receiver from the same country) as a benchmark.

As explained above, interpersonal comparison between players may in principle occur at different levels and thus variously influence their behavior in the game. Our results clearly point out that the relevant reference point for such comparison is the equality of real pay-offs, which is consistent with recommendations of local benefits theory of distributive justice and inconsistent with both the compensation and the formal equality theories.

The plan of the paper is the following: Section 2 describes the experimental protocol and the results. Section 3 is devoted to the theory: we develop several variants of the linear Aversion to Inequity model (Fehr and Schmidt, 1999) that allow us distinguishing between local and global notions of inequity expressed in real or nominal terms. On the basis of these models, we can submit the conclusion that the relevant notion of Inequity is the local one expressed in real terms. Section 4 briefly discusses the relevance of this point with respect to our understanding of which kinds of justice norms are internalized by the individuals.

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equal split in order to grant both herself and her opponent with the same amount of money. By contrast, when the sender was the low –exchange rate player, she have should offered less than the equal split. In both cases, it is assumed that the division of the stake is the mean by which final utility of money equality is achieved.

2. The experiment

2.1. The experimental protocol[9]

The design of the experiment consisted of four treatments. Senders and receivers were drawn from two countries (France and India) in the transcontinental bargaining and from the same country (either France or India) in the within country bargaining. Two treatments were transcontinental: FtoI (a French sender made offers to an Indian receiver) and ItoF (an Indian sender made offers to a French receiver). The two others, the within-country treatments, were benchmark treatments: ItoI (an Indian sender made offers to an Indian receiver) and FtoF (a French sender made offers to a French receiver).

Type of treatment	Transcontinental	Transcontinental	Within-country	Within-country
Treatment	Sender : Indian Receiver : French	Sender : French Receiver : Indian	Sender : Indian Receiver : Indian	Sender : French Receiver : French
Code of treatment	ItoF	FtoI	ItoI	FtoF

Table 1. Experimental Treatments.

In both transcontinental and within-country experiments, twenty subjects participated in each session and played six one-shot Ultimatum Games with the "absolute stranger" protocol. In each game, the amount to be divided was 10 US dollars, offers could be made in halves of dollar and two games out of six were paid. The conversion rate used for the payment was the current exchange rate of the US dollar into the local currency (Euro and Indian Rupee)[10]. The exchange rates used were common knowledge. Moreover, the subjects received a sum of 2 US dollars for showing up at the experiment.

For the transcontinental treatments, the subjects were indicated that they were to play with Indian (French) students, and that the game decisions would have been transmitted via an Internet-Chat Connection. Some basic pieces of information were provided to subjects: the per capita GDP of India and France and the price of some commodities in the two countries (in US dollars). In addition, the instructions specified the purchasing power of one dollar in each country, by indicating the price in US dollars of selected commodities in both countries.

[9] The reader is referred to the appendix for the English version of the instructions distributed to the subjects.

[10] The exchange rate used for Euro was $1 for €1.1. The exchange rate used for Indian Rupee was $1 for 47 Rps.

For this purpose, we selected items that were likely to be part of students' expenditures in both countries: coffee in the university campus, cinema ticket, music CD etc[11].

The experiment was run with a paper and pencil protocol. In transcontinental sessions every experimentalist in each country transmitted decisions through an Internet-Chat Connection. In each country, the subjects were gathered in a classroom and received the instructions and the experimental material (game-cards, ID, envelopes). After the instructions were read and a test of understanding had been conducted, the experiment was started. To make easier the logistics of the experiment, sessions where Indian (French) students were all senders and French (Indian) students were all receivers, were only organized. In the senders' classroom, the subjects were asked to write down their offer and to put the offer in the envelope. Once all the subjects had finished, the envelopes were collected and transmitted by the experimentalist with the help of a Chat Connection to the other country. Offers were then copied in the receivers' cards and distributed to the subjects; the receivers were then asked to take their decision to accept or to reject the offer. The receivers' cards were then collected, and acceptances and refusals were transmitted to the senders in the other country. For the within-country experiment the procedure was roughly the same with the exception of decisions transmission. In the latter treatments, in fact, senders and receivers sat in two different rooms and communication of subjects' decision was carried out in a third room by experimentalists. The procedure was repeated six times. Then the random drawing was done and the two selected rounds for the final payment were communicated to subjects.

French students received instructions in French and Indian students received instructions in English. A special attention was paid to the instructions' translation: the instructions were firstly drafted in English following standard UG instructions; they were then translated into French. The final version of instructions in both languages was done after a common revision, in order to make instructions equally understandable for all the subjects and as little biased as possible.

2.2. Main predictions

Taking into the account the characteristics of the Transcontinental Protocol (difference of beyond-game status, difference of purchasing power, equal nominal value of the stake), one may expect three kinds of behavior. If the first factor (beyond-game wealth effect) is relevant,

[11] For a complete presentation of purchasing power information used in the experiment, the reader is referred to the instructions in the appendix.

we should observe that the outcomes of bargaining are always in favor of Indian subjects (the interaction would allow for compensation between ex ante differences between players). If the second factor plays a crucial role (different value of one dollar in the two countries), then we should observe unequal splits occurring in the opposite direction, that is in favor of French subjects. The rationale behind this peculiar division is to equalize the real pay-off of players. Finally, if the nominal value of the stake matters, then no different behavior should be observed in transcontinental treatments with respect to previous within country experiments, nor one should find any significant differences between FtoI and ItoF treatments. Were it so, equal nominal split should be observed.

As specified above, our hypothesis is that the country of residence of players may play a role in shaping the interpersonal comparison of utility. Specifically, we do not assume that cultural norms themselves exert such an influence but, instead, that the country of residence of the players indirectly affects the equity norm that sustains the agreement: the equity norm is endogenously settled as to account for the differences of purchasing power and of income between the two countries. In principle, however, we cannot rule out the fact that Indian subjects and French subjects behave differently in ultimatum games for reasons intrinsically related to their culture. It is thus necessary to provide a counter-proving test, which invalidates the cultural discrimination story. The comparison between within-country treatments is the natural test for this latter point.

No standard experimental test of the Ultimatum Game has previously been conducted in India or France (to our knowledge), so we needed benchmarks cases to be compared with transcontinental treatments. The objective of running with-in country treatments is twofold. First, it allows establishing if bargaining behavior is the same than that previously observed using an almost identical protocol and in countries like United States, Israel, Japan etc. In particular, we want to see if there are any differences between French to French negotiation and Indian to Indian one. Secondly and more importantly, we want to compare the within country and the transcontinental treatments to test whether the identity of the subjects affect bargaining outcomes.

3. Results

All in all, we ran eleven sessions during 2002 and 2003. Six transcontinental sessions between Delhi and Grenoble were organized: three ItoF sessions, and three FtoI sessions.

Moreover, three ItoI sessions were run in Delhi and two FtoF sessions were run in Grenoble.[12] On the whole, the results of the FtoF sessions are consistent with the usual results of standard ultimatum game experiments. That is why we only ran two sessions with this treatment. The date and the average earning of each session are reported in Table 2. On average, within-country sessions lasted one hour, while transcontinental sessions lasted one hour and half.

Session ID	Date	Treatment	Number of subjects	Average Earning in US$	Average Earning in Local Currency (Rps: Indian Rupees, € : Euro)
ItoF-S1	02/19/2002	Indian Senders-French Receivers	10 couples	Senders: $10.75 Receivers: $7.42	Senders: 515 Rps Receivers: €8.1
ItoF-S2	02/21/2002	Indian Senders-French Receivers	10 couples	Senders: $8.77 Receivers: $8.15	Senders: 420 Rps Receivers: €9
ItoF-S3	02/11/2003	Indian Senders-French Receivers	10 couples	Senders: $10.75 Receivers: $8.27	Senders: 515 Rps Receivers: €9.1
FtoI-S1	02/20/2002	French Senders-Indian Receivers	10 couples	Senders: $14.45 Receivers: $6.85	Senders: €15.9 Receivers: 330 Rps
FtoI-S2	02/22/2002	French Senders-Indian Receivers	10 couples	Senders: $17.35 Receivers: $6.45	Senders: €19.1 Receivers: 310 Rps
FtoI-S3	02/12/2003	French Senders-Indian Receivers	10 couples	Senders: $14.8 Receivers: $7.9	Senders: €16.3 Receivers: 380 Rps
ItoI-S1	02/18/2002	Indian Senders-Indian Receivers	10 couples	Senders: $14.4 Receivers: $6.6	Senders: 682 Rps Receivers: 321 Rps
ItoI-S2	02/03/2003	Indian Senders-Indian Receivers	10 couples	Senders: $13.2 Receivers: $7.6	Senders: 634 Rps Receivers: 365 Rps
ItoI-S3	02/03/2003	Indian Senders-Indian Receivers	10 couples	Senders: $11.2 Receivers: $7.7	Senders: 538 Rps Receivers: 370 Rps
FtoF-S1	10/23/2002	French Senders-French Receivers	10 couples	Senders: $13.1 Receivers: $9.1	Senders: €14.3 Receivers: €10.1
FtoF-S1	10/24/2002	French Senders-French Receivers	10 couples	Senders: $13.1 Receivers: $9.1	Senders: €14.3 Receivers: €10.1

Table 2: Sessions details

As already explained, every subject played consecutively six ultimatums, changing opponent at each new round. Before dealing with each period's own features, the data are presented as a whole.

For each session, the main statistics (all periods confounded) are reported in table 3. When pooling periods, the results of ItoF, ItoI and FtoF treatment sessions are in line with what normally observed in standard UG experiment. In fact, our results do support previous

[12] A pilot session was run for the transcontinental protocol of the UG. This allowed improving some aspects of the experimental procedure and checking the feasibility and the effectiveness of the experimental communications between countries.

findings such that any offer below the 20% of the stake is rejected with a probability of (0,4-0,6) and that the average offers are between 30 and 40% of the stake. By contrast, what we observed under the treatment FtoI is radically different from the usually observed facts. Mean offers are low (between 23% and 32% of the stake) and, conditionally to these offers, rejection rates are significantly lower than in standard UG.

Sessions	FtoF[13]	FtoI	ItoF	ItoI
Number of period	6	6	6	6
Number of couples	20	30	30	30
Average Offer	3.48	2.63	3.92	3.53
Modal Offer	3	2	5	5
Median Offer	3.5	2.5	4	4
Standard Deviation	1.14	1.01	1.08	1.46
Global Frequency of Rejection	22.5%	12.2%	20.0%	9.4%

Table 3: Global statistics

In-depth inspection of data point to the change of offers over periods, implying that the pooled periods statistics do not adequately account for players' behavior. Indeed, two different temporal trends emerged. We observed a significant drop of proposals in treatments where the respondent was Indian, while offers remained almost unchanged in the treatment where the respondent was French. Before moving into the detailed discussion of the inter-periods evolution of offers, the distribution of offers and rejection rates are presented.

[13] Eleven couples participated in this session. In spite of going successfully through both instructions and test of understanding, one subject misunderstood the protocol and sent to her opponent an offer containing the amount of money he intended to keep for himself. This happened for all the duration of the experiment. He sent proposals of 6 and 7 $. After having analysed the whole results, we decided to exclude observations concerning him (and related responses by his opponents), but we considered valuable the rest of the data. We could in fact verify that the misunderstanding of the subject did not sensibly affect the behaviour of players who met him when they played with the others senders

3.1. Offers and rejection decisions.

Figure 1 reports the distribution of the offers and the rate of rejection. The subjects had the possibility of making offers with halves of dollars, but most of the offers were integers; therefore, in order to have more readable pictures, we pool the offers \$0.5 with \$1, \$1.5 with \$2, etc. Offers of \$0 have not been observed and offers higher than \$5 are very rare[14].

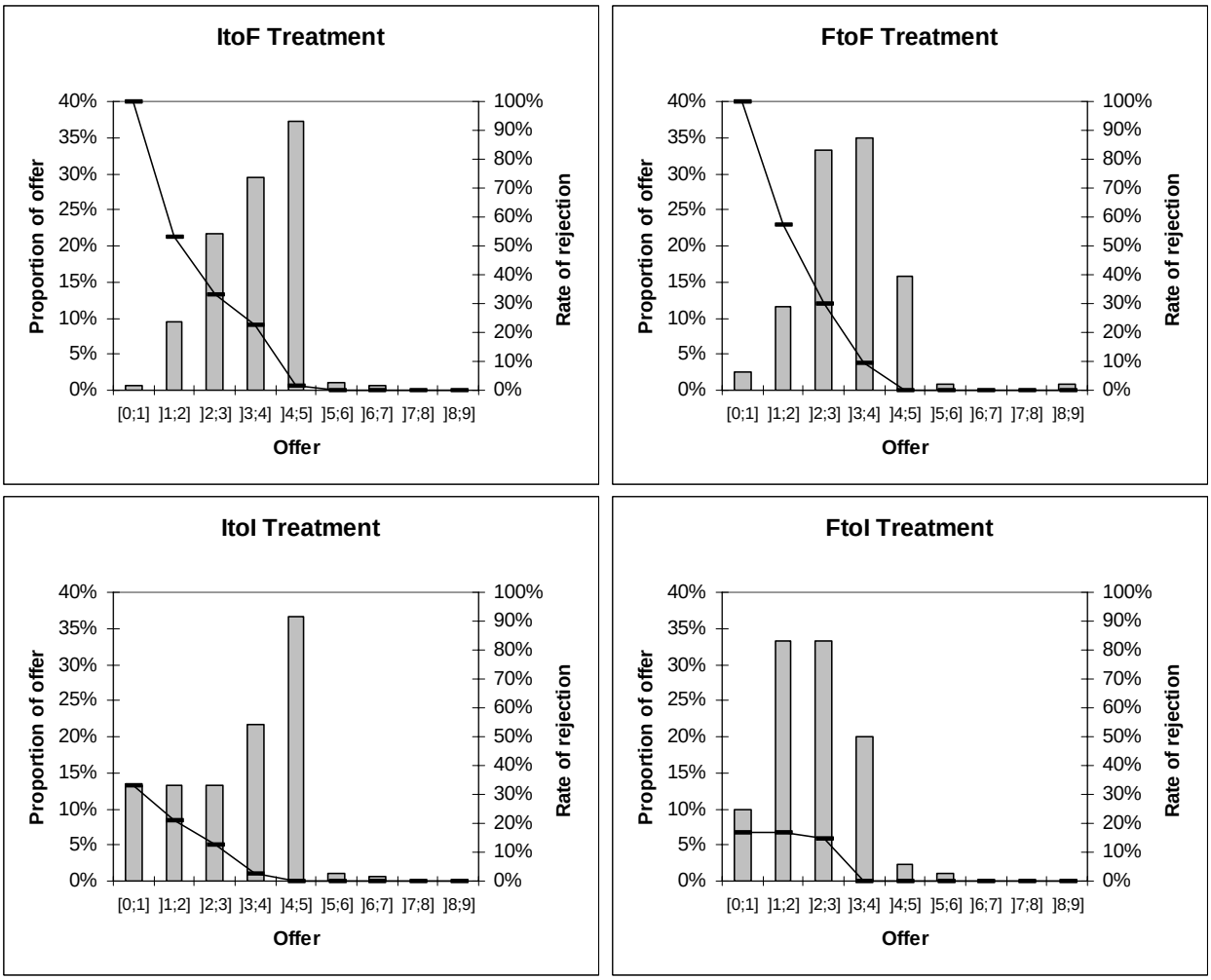

Figure 1: Offer distribution and rate of rejection
(columns represent the percentage of offer and the curve represents the rate of rejection)

The comparison of offers between ItoF and FtoI treatments is clear: the Indian senders were more generous towards French receivers than French senders towards Indian receivers. The average offer in the ItoF treatment is \$3.92, while it is only \$2.63 in the FtoI interactions. At the same time, Indian receivers were more conciliating than the French receivers. In fact rejection rates for offer below \$3 is 19% in the FtoI treatment. The corresponding feature for

[14] Offers higher than 5\$ were observed with the following frequency : two observations out of 120 for the FtoF treatment, two observations over out of 180 for FtoI, 3 observations out of 180 for ItoF and 3 out of 180 for ItoI.

the FtoI treatment is 55%. The difference between these rates can be ascribed to a different rejection threshold between Indian and French subjects. The different thresholds across Indian and French students are also confirmed by within-country treatments, where senders met receivers of same nationality. In FtoF treatment, the rejection rate relative to offers less than $3 is 60% while it is 25% in the ItoI treatment.

From these results we may conclude that the rejection threshold of Indian subjects is definitely lower than the French subjects' one and that the difference between the minimum amount of money that a player is ready to accept is a relevant factor for understanding the outcome of interactions. In addition, our data show that the rejection threshold is not common knowledge among players, even when one plays against someone coming from her same country. The evolution of proposition along the six rounds of the game can be explained by the fact that senders seek the acceptation threshold until they find the 'right' one.

3.2. Dynamics pattern

The round mean offer and the round rate of rejection for the various treatments are reported in Figure 2.

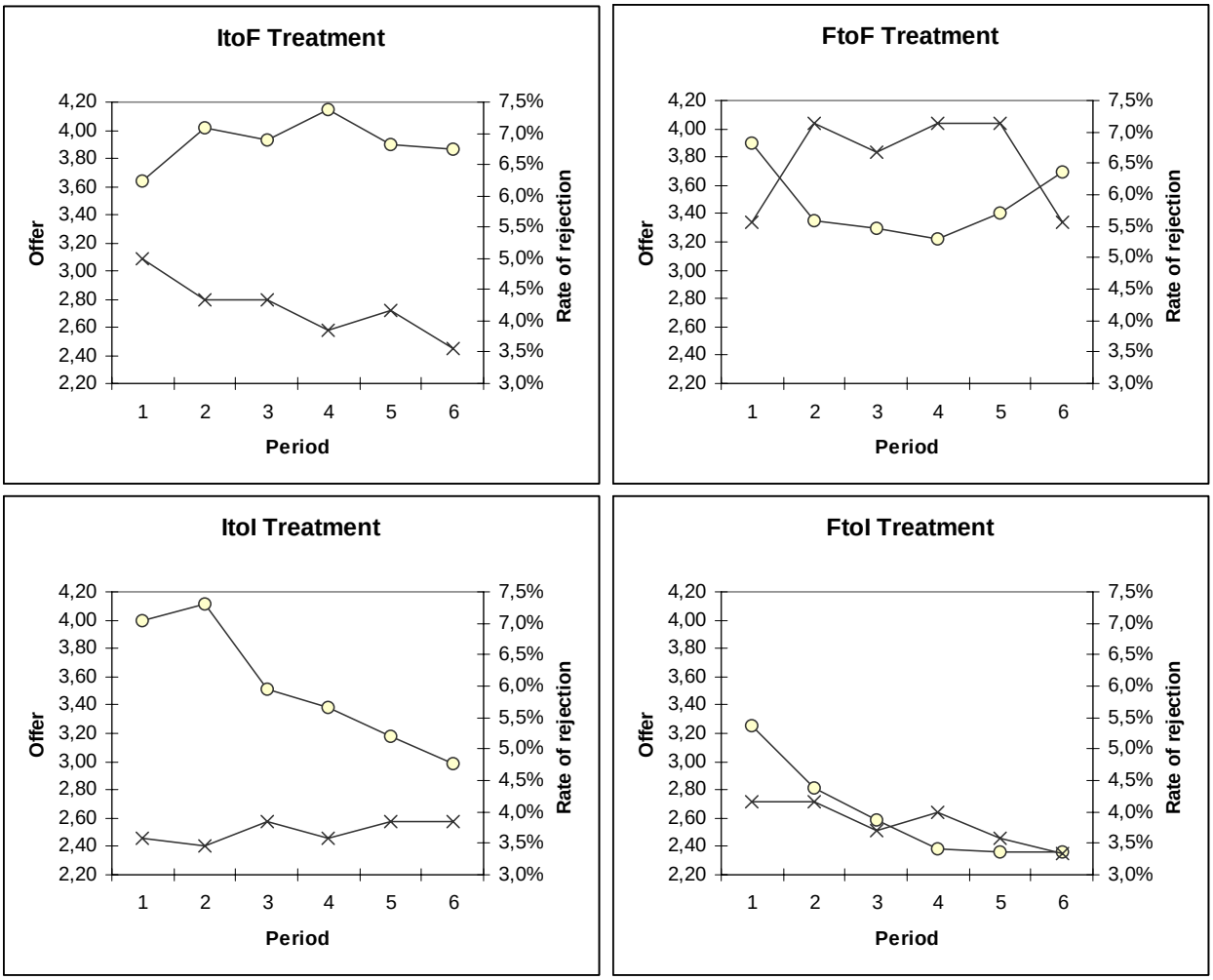

Figure 2: Offer and rate of rejection evolution

(The circle curve represents the average offer and the cross curve represents the rate of rejection)

To start with, it is instructive to see how the first round offer is very similar across all four treatments. The mean offer is around 3.3$ in the FtoI treatment and nearly 4$ in the ItoI treatment. Excepted for these two treatments, the comparison between mean offers by treatment does not reveal any statistically significant difference (at the 5% threshold)[15]. With the only exception of FtoI treatment, the observed offers are not different from what is usually found in this game.

By contrast, we found that, when repeating the game, two different trends emerged depending on the receiver's nationality, and irrespective of the sender's nationality. In particular, offers made to Indian receivers decreased progressively over successive rounds while offers sent to French receivers almost remain unchanged from the first period. The

[15] The null hypothesis that offers are identical across treatments ItoI and FtoI is rejected by a Mann-Whitney test at the .05 level (P = 0.024). We can not reject the null hypothesis across the others treatment at the same significance level.

pattern of offers over time can be explained by both the propensity to reject of receivers and by the consequences of rejection and acceptation on senders' following strategy. Concerning the latter, the reaction of senders seems to be quite homogenous (see Table 4).

	Offer rejected in the previous period			Offer accepted in the previous period		
Treatment	**Increase offer**	**Maintain offer**	**Decrease offer**	**Increase offer**	**Maintain offer**	**Decrease offer**
FtoF	**17 (68%)**	**8 (32%)**	**0**	**3 (4%)**	**49 (65%)**	**23 (31%)**
FtoI	**15 (68%)**	**7 (32%)**	**0**	**4 (3%)**	**73 (57%)**	**51 (40%)**
ItoF	**29 (85%)**	**5 (15%)**	**0**	**7 (6%)**	**73 (63%)**	**36 (31%)**
ItoI	**10 (77%)**	**3 (23%)**	**0**	**19 (14%)**	**59 (43%)**	**59 (43%)**
Total	**142**	**46**	**0**	**66**	**508**	**338**

Table 4. Offer evolution after a rejection or an acceptance

In fact, senders increased their offer or kept it unchanged after a refusal, while they maintained it unvaried or diminished it when their proposal was accepted. At the same time, as said above, the Indian acceptation threshold is lower than the French one. Overall, we observed that treatments where receivers are Indian are precisely treatments such that offers fall over time[16]. Senders keep diminishing their offers without triggering any nasty reaction on the other side. In the sixth round, the mean offer is 'only' \$2.4 in the FtoI treatment and \$3 in the ItoI treatment.

When receivers are French, the story is completely different. In these sessions, refusal occurs more often whenever offers are below \$ 3. By way of consequence, senders do not significantly vary their offer over the game and this is why proposed and accepted splits almost remain unchanged during the six rounds. In the last round, the mean offer is \$3.7 in the FtoF treatment and is \$3.9 in the ItoF treatment. A statistical test allows us to conclude that no significant difference exists between first round offers and last round offers. [17]

From these findings, it appears that the repetition of the game, even with different opponents, allows senders to identify the threshold up to which receivers are ready to accept offers. Senders' learning is made out in terms of offer reduction, which can be seriously sanctioned

[16] The null hypothesis that offers are identical across the first and the last period is rejected by a Wilcoxon signed-rank test at the .01 significance level for treatments ItoI (P = 0.0087) and treatment FtoI (P = 0.0013).

[17] The null hypothesis that offers are identical across the first and the last period is not rejected by a Wilcoxon signed-rank test at the .01 level for treatments ItoF (P = 0.2993) and treatment FtoF (P = 0.4420).

by refusals when the threshold is overcome. Thus, the last period offers integrate senders' learning about opponents' propensity to accept.

Treatment	ItoF	FtoI	ItoI	FtoF
Number of couples	30	30	30	20
Average Offer	3.87	2.37	2.98	3.70
Modal Offer	5	2	1	4
Standard Deviation	1.06	0.98	1.52	0.68
Global Frequency of Rejection	0.07%	0%	0.13%	0.1%

Table 5: Last period statistics

For each treatment, the main statistics concerning the last period are reported in table 5. Here we can see that proposals addressed to French respondents are in line with standard stylized facts in UG experiments. For the ItoF treatment, the mean and the modal offers are respectively \$3.87 and \$5. These findings are similar to those obtained for the FtoF treatment, where the mean offer was \$3.70 and the modal offer was \$4. On the other hand, the last period proposals made to Indian are sensibly lower than that. In fact, mean offers for FtoI and ItoI treatments are respectively \$2.37 and \$2.98. Modal offers are also quite low, being \$2 for the FtoI treatment and 1\$ for the ItoI treatment.

It emerged from the statistical analysis that senders make different offers according to the nationality of responders. In fact French senders' proposals are significantly different when they are to be received by an Indian or a French respondent[18]. Analogously, offers coming from the Indian senders vary with the respondents' identity[19].

Overall, offers made to Indian subjects are, everything else being equal, more unfavourable than offers made to French subjects. Facing a French sender, an Indian respondent is confronted with lower offer than a French respondent. Similarly, an Indian sender is more likely to offer less when the receiving end of the proposal is an Indian, rather than a French. This finding is at odds with the view of justice as compensation, for which beyond-game

[18] The null hypothesis that offers are identical across treatments FtoI and FtoF is rejected by a Mann-Whitney test at the .05 level (W = 302.5 and p.c. = 0.0000).

[19] The null hypothesis that offers are identical across treatments FtoI and FtoF is rejected by a Mann-Whitney test at the .05 level (W = 302.5 and p.c. = 0.0000).

wealth differences should matter. Also, our results do not validate the conjecture of equal nominal amounts division. Indeed, the (observed) splits in transcontinental bargaining are significantly different from the (observed) splits in with-in country bargaining. All these facts considered, we shall conclude that the relevant explanation behind TUG is the willingness to compensate for a difference of purchasing power between India and France; to reach this conclusion, a more precise theoretical framework is needed, which is developed in the next section.

4. Theoretical framework

4.1. Existing models

Following Fehr and Schmidt (2000)[20], we distinguish between several theories that have been introduced for explaining the anomalies observed in the experimental context of bargaining, notably in UG experiments. Though presenting somewhat different explanations, all these theories start from the inadequacy of the standard *homo economicus* model in a context where individuals have to share a certain amount of resources they are entitled to.[21] *Homo economicus* paradigm assumes that individual preferences are self-regarding and outcome-regarding. Experimental evidence challenges both assumptions, and observed anomalies in experiments are usually explained by other-regarding and process-regarding preferences[22] (i.e. subjects would not only care about their own absolute payoff and they would be concerned with some procedural aspects of the experimental bargaining, as the role assignation or the initial endowment etc). Two sorts of explanation have been provided: the first view –- referred to as the Relative Payoffs Reference Point Models (Brandts and Sola 2001) and called for simplicity the "Fairness View" — consists in broadening the sphere of individual's rationales for action. The well-being of the others and/or the concern for their

[20] Fehr E. and Schmidt K. M., "Theories of Fairness and Reciprocity—Evidence and Economic Applications „ Working Paper presented at the World Congress of the Econometric Society in Seattle.

[21] Note that we deliberately do not take into consideration the alternative explanations given to UG anomalies, as the adaptive learning one or, more generally, the ultra-long hypothesis one (See Binmore, 1998 for a survey. In particular, the limited number of rounds in our protocol did not allow testing such theories.

[22] Gintis (2000).

relative performance are here to be envisaged as relevant motives for individual choices[23]. The other view —"the intention-based reciprocity view" modeled through psychological games[24] — assumes that one's own behavior is conditioned by the expectations on what the other's behavior could be, or by the intentions that a player would be supposed to express by taking such and such other decision. Due to the general format of UG tested by our protocol, we focus exclusively on the first approach as the examination of intention-based reciprocity models would have required a different experimental setting (relying on the mini-UG for instance).

Fehr and Schmidt (Fehr and Schmidt 1999) assume that individual preference linearly depends on one's own payoff and on the difference between this payoff and the opponent's one. Their *Homo Egalis*[25] maximizes the following utility function u_i:

$$\begin{aligned} u_i &= x_i - \alpha_i(x_j - x_i), x_j > x_i \\ u_i &= x_i - \beta_i(x_i - x_j), x_i \geq x_j \end{aligned} \qquad (1)$$

With x_i the nominal pecuniary payoff of individual i, α the parameter which captures the equity concern when one has less than the other ($\alpha > 0$) and β the parameter which captures the equity concern when one has more than the other ($0 \leq \beta \leq 1$). Because we shall study variants of this model, it is useful to refer to it as the model of linear *Aversion to Local Inequity in Nominal terms*, in short: the *ALINom* model.

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[23] Let us consider a bargaining game between player *i* and player *j*. Models of fairness can be classified as: 1) Model of Altruism (Andreoni and Miller, 2002; Charness and Rabin, 2002) : the utility function of player *i* is increasing in the payoff of player *j* ; 2) Model of Relative income and Envy (Bolton, 1991, Kirchsteiger 1994): the first partial derivative of utility function of player *i* with respect to the ratio of *i*'s payoff to *j*'s payoff is strictly positive when the payoff of player *j* is inferior to the player *i*'s one and zero otherwise ; 3) Model of Inequity Aversion (Fehr and Schmidt, 1999 ; Bolton and Ockenfels, 2000): player is altruistic towards other players if their payoff are below an equitable benchmark, but she feels envy when the payoff of the other player exceeds this level. In the second of these two models, the utility function is assumed to be weakly increasing and concave in player's own payoff; for any given payoff, the utility function is strictly concave in player's *i* share of total income and obtains a maximum for equal split.

[24] Rabin (1993), Dufwenberg and Kirchsteiger (1998), Charness and Rabin (2002).

[25] Gintis 2000.

In the ultimatum game, the sub-game perfect equilibrium defines a division $(x_i, x_j)^*$ of the stake such that the sender's utility is maximized under the constraint that receiver does accept the offer; one can thus compute the rejection threshold and the SPE offers and estimate the parameters of aversion to inequality in the population under observation.

In the following part of the paper, we discuss a model which generalizes the model of Fear-Schmidt; in fact, we could have used another specification for the aversion to inequity utility function (as the model proposed in Bolton and Ockenfels (2000) or the one proposed in Chariness and Rabin (2002). For a simple Ultimatum Game, in fact, these three models give no substantially different predictions while they differ for other bargaining games and non-cooperative games. The discussion of the relevance of each model is thus beyond the scope of the paper, and a different transcontinental protocol should be implemented to provide an adequate test of these competing models would be required[26].

4.2. A theoretical framework for the TUG

As in any other ultimatum game, the individual behavior observed in TUG rests on strategic considerations and to some extent on fairness norms. The second factor is relevantly affected by the interpersonal comparison of players' utility. When subjects belong to the same population, a reasonable assumption is to consider that the interpersonal comparison of utility comes down to a comparison of two players' pecuniary payoff[27] (i.e. the relative share of each one of them, as it happens for Fehr-Schmidt's *homo egalis*). It is so since without any precise knowledge about the opponent's preferences each player can be assumed to shape his beliefs on the opponent's behavior on the basis of what she knows of individuals "randomly chosen" in the group. In experimental interactions, players all have the same information about the kind of person they are matched with, and relevant common knowledge is, for instance, that they all are students living in the same city. In addition, as the attribution of roles in the bargaining is decided randomly at the beginning of the experiments, there are no reasons to believe that the population of senders is different from the population of receivers.

An important question in a transcontinental setting is whether individuals belonging to different societies have different preferences for equity according to their culture. If one thinks that the only difference between a TUG and a standard UG is that individuals joining it have different norms of fairness due to their culture, the Fehr-Schmidt model can be assumed

[26] Moreover, changing the parameters, the model of Charness and Rabin for two players is not different from the Fehr and Schmidt one.

[27] Considering that players are equally risk neutral and that they belong to the same income-class.

and the α and β parameters interpreted as tastes for equity specific to each country. This extended model would thus have 4 parameters rather than 2. But, is this required to explain players' behavior? The following discussion is intended to show that there is no need to multiply the number of parameters and that, instead, the original Schmidt's model suffices, once the nature of payoffs involved in the negotiation is taken into consideration.

Suppose that player *i* derives from the game interaction a "game-utility": $u_i = (y_i, y_j)$ that depends on two arguments: y_i and y_j that respectively describe the outcome of the game for *i* alone and *j* alone. Utility is supposed to be increasing and concave in its first argument and, under certain conditions, increasing and concave in its second argument, and we shall specifically consider the same linear form as Fehr and Schmidt:

$u_i = y_i - \alpha\ (y_j - y_i)$ *for* $y_j > y_i$

$u_i = y_i - \beta\ (y_i - y_j)$ *for* $y_i > y_j$

and we shall discuss what exactly y_i and y_j must be.

Consider the two conditions:

(i) The outcome of the game for a player can be described in terms of what she obtains *in the game* (or "locally"), without reference to the player situation outside the game.

(ii) The comparison of utilities is performed at the *nominal* monetary payoff, without taking purchasing power into account.

Then, by letting $y = x$, one obtains the Fehr and Schmidt's model that we labeled *ALINom,* where the relevant social reference norm is the equality of game payoffs in nominal terms.

A natural question is: what is the relevant social reference norm in a TUG?

Suppose that each player makes use of the actual exchange rate to compute her final utility: call θ_i the purchasing power rate to be used when one wants to convert dollars in final commodities (for instance, according to what specified in the experimental instructions θ_i can measure how many cinema tickets player *i* can buy when she earns one dollar; for French students θ_i is about 0.2 while for Indian students θ_i is about 1). Here, we let $y_i = \theta_i x_i$, and the modified Fehr and Schmidt's model reads:

$$u_i = \theta_i x_i - \alpha(\theta_j x_j - \theta_i x_i) \text{ for } \theta_j x_j > \theta_i x_i$$
$$u_i = \theta_i x_i - \beta(\theta_i x_i - \theta_j x_j) \text{ for } \theta_i x_i > \theta_j x_j \qquad (3)$$

Utility of player *i* is thus increasing in her "real" payoff (i.e. in the amount of goods she will buy in receiving x dollars) and, holding this payoff constant, has a maximum for $x_i = (\theta_j / \theta_i) x_j$. In other words, the second argument of the utility function describes the concern for equity that two different ex-ante players have when confronted in an ultimatum. Note that in this case the ex-ante difference corresponds to a pure difference of purchasing power in the two countries: as we have already noted above one dollar is much worthier in India than in France. Looking for a social norm of equity means here to equalize material payoffs and thus equalize monetary payoffs after having corrected for the purchasing power. The reference for equity concerns is still the incomes obtained by the players in the game only. We can call this model the linear model of *Aversion to Local Inequity in Real terms* (in short: the *ALIReal* model).

Finally, consider the case $y_i = R_i + \theta_i x_i$ where the interpersonal comparison of utilities is broader than the one proposed above, that is in the equation (3),.

Then:

$$u_i = R_i + \theta_i x_i - \alpha_i((R_j + \theta_j x_j) - (R_i + \theta_i x_i)) \text{ for } (R_j + \theta_j x_j) > (R_i + \theta_i x_i)$$
$$u_i = R_i + \theta_i x_i - \beta_i((R_i + \theta_i x_i) - (R_j + \theta_j x_j)) \text{ for } (R_j + \theta_j x_j) < (R_i + \theta_i x_i) \qquad (4)$$

The yardstick of social comparison is now the individual *overall* income, i.e. the individual's income beyond the game (R_i) plus the real gain obtained in the interaction ($\theta_i x_i$). This variant of the Aversion to inequity could be called the linear model of *Aversion to Global Inequity in Real terms* (in short: the *AGIReal* model).

As we shall explain later in more details, the *ALIReal* model seems to be more consistent with what is observed in the experiment. Before that, let us discuss the meaning and the implications for fairness in both models.

As usual in the aversion-to-inequality-class of models, the equity term in the motivation function (3) can be interpreted as the interplay of two contrasting forces when measuring the effect of giving one more dollar to my opponent: each individual evaluates his standing in absolute terms and in relative terms. The way in which such an evaluation is performed is however specific to the transcontinental setting. In fact, the comparison of utilities is done at

the level of the real payoffs, in order for the purchasing power inequality to be included in the relative standings comparison. Since in the game the marginal utility of money is lower for French than it is for Indian (with the same pecuniary payoff Indian can buy about four or five times what French player can do), the inequality of purchasing power operates as the reference norm. The specific kind of inequality related to the game is the rationale behind the norms that we call "Local Equity"(the *ALIReal* model (3) opposed to the original *ALINom* model of Fehr and Schmidt).

By contrast, the *AGIReal* model (4) predicts that the comparison of utilities is performed at a broader level, a global one. In that case, what individuals take into account to measure their relative standing is the (difference between their) overall ("global") wealth beyond the game. Being averse to Global Inequalities among individuals entails that subjects base their interpersonal comparisons of utility on what they know of the others' utilities both inside and outside of the game. It means that, even when measuring income inequalities, utility should measure the individual's global well-being (see Elster and Roemer, 1991). This is why the splitting behavior associated with the Global Inequity vision of things is a compensatory one, in favor of the beyond-game worst-off individual. If individuals were considering this norm of justice, individuals should be driven to use the game as an opportunity for reducing overall inequalities. In our experiment, this would have meant high rejection thresholds for the Indian receivers when confronted to French senders and corresponding high French offers to Indians, and lower Indian offers to the French than to the Indians. Indeed the opposite was observed in both transcontinental treatments.

4.3. Discussion of the *ALIReal* model

From now on, we only focus on the model (4), as the experimental data unambiguously show that this model is more relevant than the others for the TUG.

In the *ALIReal* model a sub-game perfect equilibrium offer is a x_j* such that:

$$\begin{cases} x_j^* = s(\alpha,\theta) \; for \; \dfrac{\beta}{\theta(1-\beta)} < 1 \\ x_j^* \in \left[s(\alpha\ ,\theta), \dfrac{\theta}{\theta+1} \right] for \; \dfrac{\beta}{\theta(1-\beta)} = 1 \\ x_j^* = \dfrac{\theta}{\theta+1} \; for \; \dfrac{\beta}{\theta(1-\beta)} > 1 \end{cases}$$

where $s(\alpha\ ,\theta)$ is the minimum acceptable offer by the player j, i.e. such that $u_j(s(\alpha\ ,\theta),1-s)\geq 0$ (with $\theta=\frac{\theta_i}{\theta_j}$). One can easily verify that $s(\alpha\ ,\theta)=\frac{\theta\alpha}{1+\theta\alpha\ +\alpha}$.

As an illustration, we make the assumption that:

$$\theta=\frac{\theta_i}{\theta_j}=4,$$

i.e. each dollar is 4 times worthier to Indians than to French. According to the information given to subjects (see the instructions in the Appendix), this is a reasonable value for θ. To give some insights on how the *ALIReal* model works, consider for instance α=1/4; when an Indian makes offers to a French, utility for both players are represented in fig. (3) and (4), as functions of the share of the Indian player. The minimum acceptable amount by French players (see fig. (4)) is:

$$s_F(\alpha\ ,\theta)=\frac{\theta\alpha}{1+\theta\alpha\ +\alpha}=\frac{4\alpha}{1+5\alpha}\cong 4{,}5\ \$$$

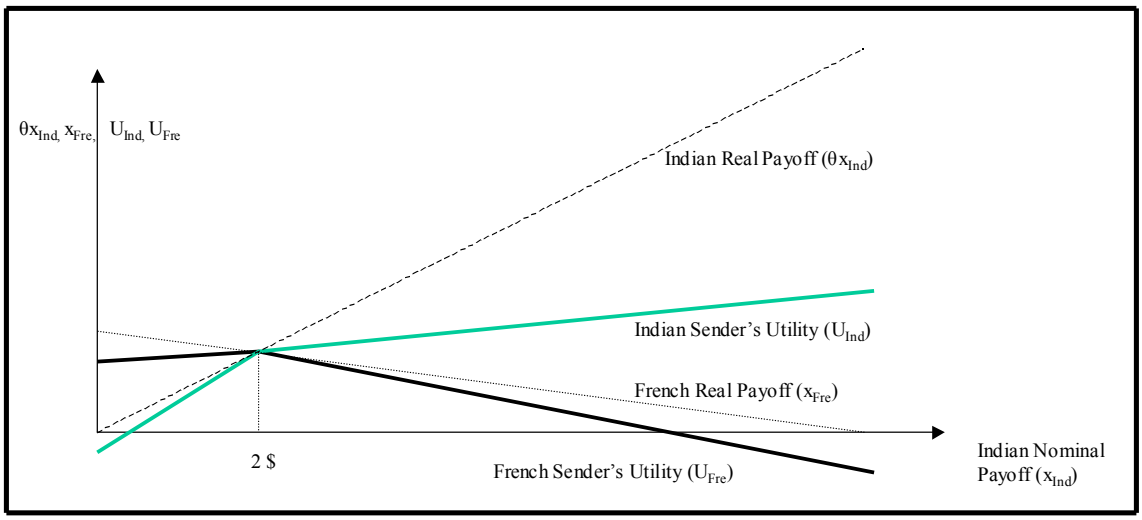

Fig. 3 : Preferences for equity in the transcontinental bargaining (I->F) – all propositions accepted

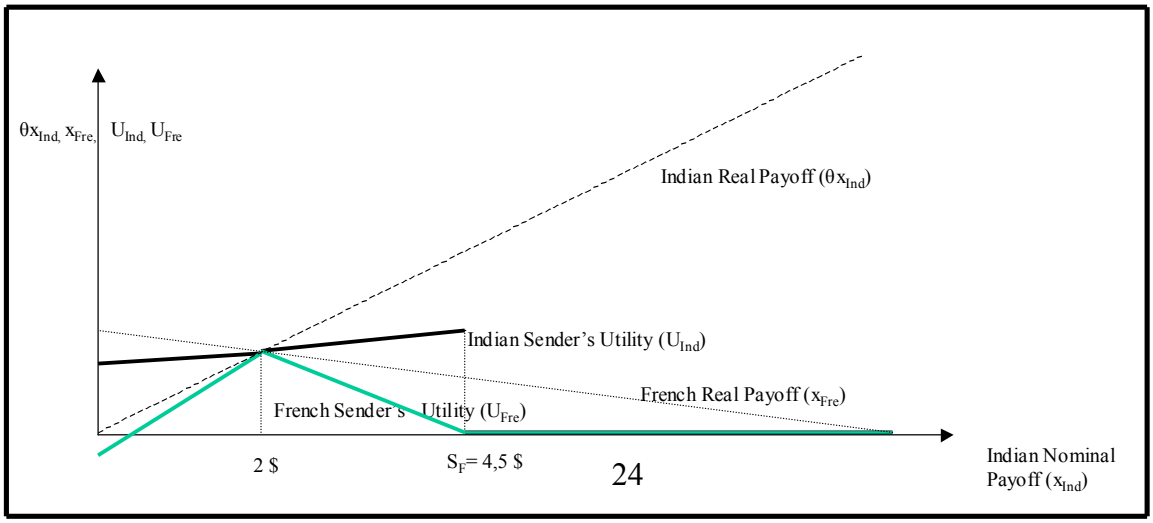

Fig. 4 : Preferences for equity in the transcontinental bargaining (I->F) – with F's rejection threshold.

Analogously, one can compute the minimum acceptable amount by Indian players (see fig. (5)) :

$$s_I(\alpha\ ,\theta) = \frac{\alpha}{\theta + \theta\alpha\ + \alpha} = \frac{\alpha}{4 + 5\alpha} \cong 0{,}5\ \$$$

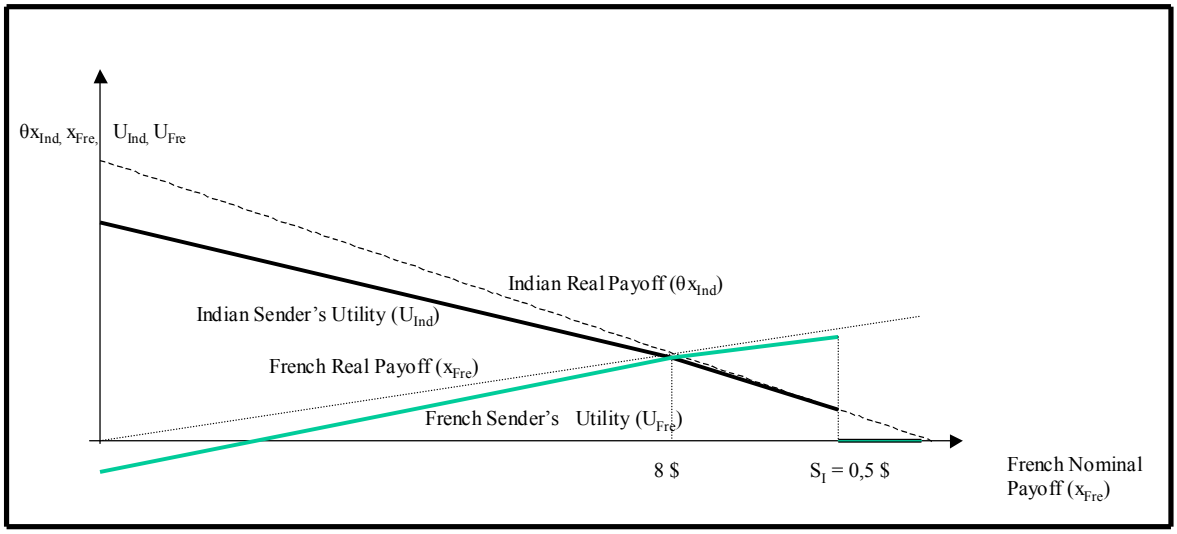

Fig. 5 : Preferences for equity in the transcontinental bargaining (F->I) – with I's rejection threshold.

It is not really possible to discuss all the quantitative features of this model in relation to the experimental data (due to the few observations), but some illustrative comments are worth making:

1. With the chosen value of θ, in both treatments the equality of real payoffs is achieved for a split of (2, 8) in favour of the French. The (2,8) split was proposed 51 times out of 120 in the FtoI treatment and 13 times out of 120 in the ItoF treatment. In particular, note that, in the latter, the large ex-ante payoffs inequality should have produced some Indian offers superior to 5 dollars, but this almost never happened.

This is similar to what is usually observed in UG experiments. The *ALINom* model, for instance, predicts such a fact, as the highest offer that the most egalitarian individual would be ready to make is half of the stake. By contrast, our *ALIReal* model is not incompatible with

offers exceeding the formal (5-5) equality, equilibrium offers from Indian are high if the parameter β is very large. For reasonable values of the parameters, the equilibrium offer for Indian players is close to 5$. The model predictions are here hardly distinguishable from formal equality. The empirical fact that individuals almost never offer more than one half of the stake can thus be explained either by not too large values for β (0< β <1/2 is plausible), or by the idea that formal equal split may be perceived by the individuals as a focal point close to equilibrium.

In the *ALIReal* model the marginal utility of transferring one dollar to the other player is always positive and, for a given value of θ, it is higher than the marginal utility of keeping one dollar for one-self depending on the magnitude of β; when Indian players make offers to French, for a high value of β (i.e. >4/5), the disutility of keeping money for one-self rather than transferring it to the other player is extremely high, and the Indian's game utility has a maximum for the equal real payoffs split. The equilibrium offer for α=1/4 and θ=4 is :

$$\begin{cases} x_F^* = s(1/4,4) = \frac{4}{9} \; for \; \beta < \frac{4}{5} \\ x_F^* \in \left[\frac{4}{9}, \frac{4}{5}\right] for \; \beta = \frac{4}{5} \\ x_F^* = \frac{4}{5} for \;\; \beta > \frac{4}{5} \end{cases}$$

We can have situations where subjects offer systematically more than the estimated rejection threshold, depending on how averse to local inequity such players are. The equilibrium offer in the FtoI treatment is :

$$\begin{cases} x_I^* = s(1/4,4) = \frac{1}{21} \; for \; \beta < \frac{1}{5} \\ x_I^* \in \left[\frac{1}{21}, \frac{1}{5}\right] for \; \beta = \frac{1}{5} \\ x_I^* = \frac{1}{5} for \;\; \beta > \frac{1}{5} \end{cases}$$

Though we observed no ItoF offers of 4/5, some Indian subjects offered more than $4.5 (the minimum amount French are ready to accept); for instance, looking at the 5th and 6th rounds offers[28] in the ItoF treatment, 4 subjects (out of 10) offered $5. It is thus reasonable

[28] It is a common procedure, in interpreting UG experimental data, to build estimations on the basis of the last periods subjects' behavior. This is motivated by the fact that, at such time of the experiment, subjects have indisputably understood the game and they might have learnt from the previous rounds (last rounds are thus seen as rounds of "converging behavior").

consider that $\beta \leq 4/5$. In the FtoI treatment, French systematically offered more than the expected minimum acceptable amount ($0.5), and thus it is quite likely that $\beta > 1/5$.[29]

2. Note that, given θ, we only fit data with the two equity parameters (α, β); that is we only explain the differences in the two treatments by the mean of the diversity of purchasing power and without appealing to a culture innate difference.

There exist two reasons for which it is more attractive to use this model rather than the original Fehr and Schmidt's one (modified for taking into account the culture-specificity of equity norms). First of all, if norms of culture are specific to countries or societies, one should be able to observe them in the normal framing of intra-country ultimatum game. That is, as we have observed that Indian made quite substantial offers and reject only very low offers, we could extrapolate such a behavior and conclude that Indian are highly averse to unfair distributional outcomes as senders and lowly averse to unfair split as receivers. But if this was true, Indians should be equally highly/lowly averse to unfairness when they play against Indians. In other words, if a population effect exists and it is relevant, we should observe Indians making high offers to Indians and Indian rejecting low offers made by Indians with a low propensity. As we have discussed above, one can easily reject the first fact, although it is harder to conclude on the second. On the French side, the FtoF treatment shows that French senders behave as their Slovenian or American fellows (Roth *et al.* 1991), for instance, they will offer nearly the equal split in most of French-French interactions and reject more than one time in two an offer lower than 20% of the stake. Once again, this is not what we observed when French are confronted with Indians (at least, as far as concerns the sender's behavior).

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[29] One should take the previous argument as an illustration rather than an estimation of aversion to inequity parameters in the population of players (as done in Fehr and Schmidt, 1999). In fact, there exist two reasons for which we cannot directly compare the rejection thresholds predicted by the model (3) with what we observed : we have very few refusals and we cannot estimate directly the minimum acceptable amount by looking at the actual rejections in the experiment (the occurrence of a rejection simply says that the threshold have been overcome) ; neither can we estimate the sender's parameter of aversion to inequality since, as a consequence of the previous point, we cannot establish to what extent offers are superior to anticipated rejection thresholds. However, we can reasonably explain the difference between the two transcontinental treatments, namely that Indian make substantial offers to French and that French make low offers to Indian, by the fact that Indian expect French to reject too unequal real payoff splits while French expect Indian to accept unequal nominal payoff splits.

The second reason why a model as the ALIReal model (4) is more interesting than a "trivial" extension of the original one, is the fact that it can be used to interpret a larger set of laboratory data, and in particular not only the data coming from transcontinental experimentation. Consider the experiment by Kagel, Kim and Moser, where senders and receivers were alternatively applied different rule for computing their final payoff. In the protocol, they specify a value of θ nearly equal to 3. With such a value and considering the same value for α ($\alpha = 1/4$), our model can organize their observations: the estimated rejection threshold is about 37.5% of the stake when the sender is given the low conversion rate and 6% when the sender is given the high conversion rate (and β varies between 1/4 and 3/4[30]).

Finally we have to discuss the possibility that bargaining behavior changes across time. A plausible explanation is that a sort of dynamic effect operates complementarily to the Local Equity norm. The specific norm of fairness that is implemented in a transcontinental ultimatum game needs some time to be operational and effective. Both players are likely to spend the first rounds of the game to partially adjust their behavior on their opponent's one, as they need to improve their reciprocal knowledge; the discovering of the other is accompanied by the implementation of the relevant norm of fairness.

5. Discussion

To conclude, in the transcontinental game the bargaining works as a mean to achieve the local equality (i.e. related to the marginal gains obtained in the game). The transcontinental protocol allows to distinguish between two factors: 1) the ex-ante status of the player and 2) the game status of the player; usually these two elements are confounded as players are equal ex-ante: they are drawn from the same population and a) by implicit assumption, they are endowed with the same preferences—in particular with identical marginal utility of money—and b) by the means of experimental protocol, they have the same initial endowments. While in the traditional UG, the inequity aversion concerns can only intervene with respect to the "unjust structure" of the bargaining game in our version of the UG players make use of the game to impose a social norm – what we called "local equity claim"—aimed to re-establish the equality.

[30] The average offers for the first and second treatment were respectively of 54.4 and 24.2 out of 100.

If they are confirmed, these conclusions are relevant for understanding which kind of norms of Justice are internalized by the individuals. The agents can consider interactive situations in two different ways. According to a first conception of Justice, the interaction is one small world within which equity norms apply. The interpersonal comparisons of utility are here performed at the level of marginal utilities involved in the experiment. We can term "Local Equity" this conception. For instance, Local Equity could sustain the argument that an equitable division is one such that each participant can buy the same amount of good with the marginal income of the experiment. The crucial point is here that one can buy more with 5 dollars in India than in France.

According to a second conception of Justice, an interaction is an opportunity to modify the situation of the individuals in some "just" direction. The interpersonal comparisons of utility are here performed at the level of non-marginal utilities, that is utility taking into account the individual's status beyond the experiment, for instance her total income. Call this the "Compensation Equity" conception. Compensation could sustain the argument that an equitable division is one such that the amount of goods that participants can buy with their total income tends to be equalized through the experiment. The crucial point is then that only allocating more to the Indians than to the French will go in the direction of equalizing total incomes. Our data show that Local Equity, rather than Compensation Equity, is the relevant conception of Justice for explaining the subjects' behavior.

We therefore reach, in the bargaining context, the same conclusion as Elster (1991) in other contexts: "...doctors and other specialist allocators do not see their role as that of reducing social injustice. They are specialised providers of specific services, not promoters of overall welfare. (...) If the specialists are aware that there is a bigger picture, they leave it to others. Often, however, nobody feels responsible for the bigger picture. The many local-justice decisions that are made by different institutions can add up to a global injustice."

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Instructions.

Introduction

Thank you very much for participating in this experiment. The object of the session is to study how people make decisions. If you follow the instructions and make careful decisions, you might earn a certain amount of money.

Currency

The currency used in this experiment is US dollars. All monetary amounts will be denominated in this currency. Your earning in dollars will be converted into Rupees at an exchange rate to be described later. Details of how to make decisions and earn money, and of how you will be paid, are provided below.

The decision situation

In this experiment, you will participate in **six** rounds. In each round, you will be paired with another person and both of you will be asked to make decisions.

You will never be informed of the identity of any of the people with whom you are paired, nor will any of them be informed of your identity.

In each round you will be presented with a problem about which you must make a decision. In each problem there are two decision makers: a sender and a receiver. You will be assigned either the role of a sender or that of a receiver randomly at the beginning of the experiment. You will keep the same role for all six rounds but will be paired with a different individual in each round.

In this decision-making situation the sender must decide how much of a given amount of dollars, in this case **$10**, to send to the receiver. (Offers must be made in multiples of 0.5 US dollars). The receiver must decide whether to accept or reject the sender's offer. If the receiver accepts the offer, then the receiver gets a payoff equal to the offer and the sender gets a payoff equal to 10 minus the offer. If the receiver rejects the offer, then both the sender and the receiver will get a payoff of 0. For example: say the sender chooses to offer the receiver x dollars out of the available ten, if offer is accepted, the sender's payoff will be 10-x and the receiver's payoff will be x, but if the offer is rejected both the sender and the receiver will get 0. At each round, the sender is paired with a different receiver and he has $10 available for the new offer.

The people with whom you will be paired

In this experiment, the other people who participate at the decision problem are French students who have very similar characteristics to you in terms of age, studies and so on. Your decisions will be transmitted via an Internet-Chat Connection, since they will be physically located in France. The experiment co-ordinator will provide the transmission.

How the experiment takes place

At the beginning of the experiment, you will be given an envelope. On the back of the envelope you will find your Identification Number (ID). Take care of that number, as you will have to use it throughout the experiment.

In the envelop you will find:

- One identification card
- Six experiment cards (one for each round)

The identification card tells you if you are to act as receiver or sender.

If you are the sender:

In the first round please take the first round experiment card and write down your offer. Then put the card into the envelope. The experiment assistant will then collect the envelopes. You will have to wait for 5-7 minutes (the time required to transmit your offer to France and receive the answers back) before the experiment can continue. Once the answers have been received, your experiment card will be retuned to you. You will find the receiver's decision to accept or reject your offer as well as your income in that round.

Before starting the next round, the experiment assistant will collect the experiment card. Once you have been told that the second round can begin, repeat the above steps.

If you are the receiver:

In the first round please take the first round experiment card and wait for some minutes while the sender's offer is made and transmitted. The experiment assistant will collect your card and give it back to you with the sender's offer. You will then write down whether you accept or reject the offer, put the card back into the envelope and return it to the experiment assistant. After this your income for the round will be computed and written onto your card which is then returned to you. Before the next round starts, the experiment assistant will collect the experiment card of that round. When you are told that the following round can begin, take a new experiment card and repeat the above steps.

Warning : you are not allowed to communicate with the other participants at any time of experiment. If you do so, you will not receive any payment at the end of the experiment.

After the sixth round…

Between the end of the sixth round and the moment of receiving your payment, you will be given a questionnaire about the experiment. The questionnaire is also part of the experiment and it is important that you fill in every part. The questionnaire is anonymous. You do not have to sign it, nor are you asked to reveal your identity. After completing the questionnaire, the experiment assistant will collect it and accompany you to the payment room. In this room will be a payment envelope with your ID on the back. Show your identification card to the assistant and hand over the experimental materiel you have been delivered with (envelop, pen, instructions sheets) in order to get the envelope.

How you will get paid

You will receive **2 US dollars** simply for showing up today and completing the experiment.

In addition, you will receive a payment based on the outcome of the six rounds of the experiment in which you participated. **Two out of the six rounds** that you participated in will be randomly chosen and you will receive the payoff that you earned in these two rounds. For instance if rounds 3 and 4 are drawn and your payoffs in those two rounds were x and y, you will receive (x+y)US$+2US$. The random draw will be done publicly, by using a dice, after the end of the sixth round (there will be two random draws, one for each country).

How your payoff will be converted into cash

The exchange rate that will be used to compute your final payment is the following:

For every dollar that you obtain in the decision problem, you will receive 47 Rupees, which approximately corresponds to the current exchange rate.

The French students will also receive 2 US dollars for their participation. For every dollar they receive in the decision problem, they will receive 1.1 Euro, which approximately corresponds to the Euro-Dollar exchange rate.

To sum-up: both you and French students will receive the following payments: 2US$ for your participation and the payoff of the two rounds selected by the random draw. All the amounts of money in dollars will be converted into Rupees for you, and into Euros for French Students.

Some details about the purchasing power in the two different countries

Here there are some details about the purchasing power in France (prices are on average):

1US$= 1 coffee in the university campus

2US$= 1 Mc Donald Cheese-Burger

5US$= 1 cinema ticket

8US$= 1 paper-back book (French pocket edition)

20US$= 1 music-CD (e.g. international rock artist/Bruce Springsteen)

Yearly 2001 GDP per capita in France: 23472 US$

Here there are some details about the purchasing power in India (prices are on average):

1US$= 1 cinema ticket

2US$= 1 meal in a medium class restaurant

5US$= 1 music-CD (e.g. international rock artist/Bruce Springsteen)

8US$= 4 English penguin paper-back books

20US$= Fare for a return train journey (3000 km, i.e. 1500 km one-way) for 1 person

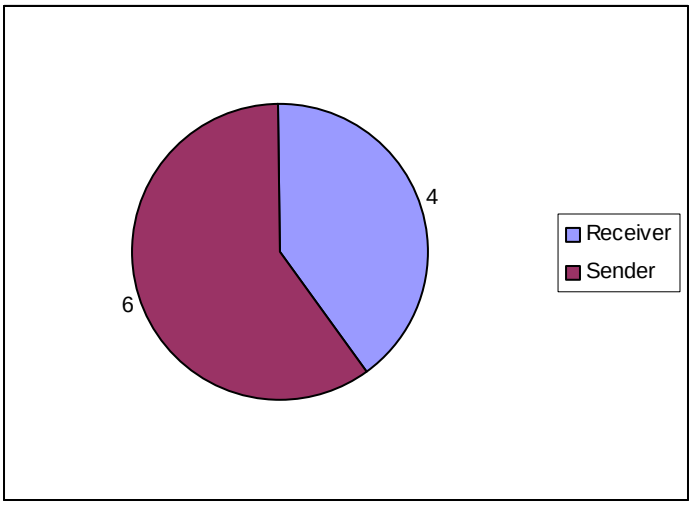
Yearly 2001 GDP per capita in India: 473 US$

French students are given the same informations about the purchasing power in the two countries and about the exchange rate of Euro-Dollars and Rupees-Dollars.

Thank you very much for your participation!!!

Test for understanding

Please answer the following two control questions:



1. The sender makes an offer to the receiver for the amount of 4 dollars out of the available 10. The receiver accepts this offer. Thus:
   The receiver obtains……
   The sender obtains……..

2. The sender makes an offer to the receiver for the amount of 4 dollars out of the available 10. The receiver rejects this offer. Thus:
   The receiver obtains……
   The sender obtains……..